AF/IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Carl A. Reiser — Docket No.: C-3363

Serial No.: 10/765,737 — Art Unit: 1745

Filed: January 27, 2004 — Examiner: O'Neill, Karie Amber

Title: Preventing Fuel Starvation of a Fuel Cell Stack

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 4, 2008

Barbara Cecere Barbara Cecere

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Please charge the $540 fee required by 37 CFR 41.20(b)(2) to Deposit Account No. 50-1307.

(1) The real party in interest is UTC Power Corporation, South Windsor, Connecticut.

(2) There are no related cases.

(3) Jurisdiction is based on 35 USC 134(a). The appeal is from the rejections dated 12/20/07 and repeated 6/24/08. The Notice of Appeal was filed September 22, 2008. The Appeal Brief is being filed November 4, 2008.

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(4) TABLE OF CONTENTS

(5) TABLE OF AUTHORITIES

No authorities are cited herein.

(7) STATUS OF AMENDMENTS

No amendments were offered after Final Rejection.

(8) GROUNDS OF REJECTION TO BE REVIEWED

Claims 1, 2, 4 and 5 are rejected under 35 USC 102(e) as anticipated by deVaal et al, US 6,815,101 B2.

Claims 1 and 4 are rejected under 35 USC 103(a) as unpatentable over deVaal et al, US 6,815,101 B2.

Claim 3 is rejected under 35 USC 103(a) as unpatentable over deVaal et al, US 6,815,101 B2 in view of Gast Publication US 2005/0161520.

(9) STATEMENT OF FACTS

The second from last element of all independent claims recite "sensing the direction of flow of gas" - claims 1 and 2 add "between said flow fields and ambient"; and claims 4 and 5 add "from said flow fields".

Paragraphs 4-6 of the Declaration of Carl Reiser, dated 2/18/08 ("Reiser, hereafter) establishes as unrefuted fact that the only monitoring of hydrogen in deVaal is hydrogen concentration (not flow),

in an environment with oxygen, for the purpose of avoiding explosions. See deVaal 13:35-37.

Paragraph 11 of Reiser establishes as unrefuted fact that deVaal does not monitor any flow at all.

The last element of all independent claims (1, 2, 4 and 5) recites "disconnecting the electrical load from the fuel cell stack in the event that there is [or 'in response to'] no flow of gas from said flow fields toward ambient". The bottom of page 5 of the Office Action (O.A.) dated 12/20/07, and the 2nd sentence of page 5, O.A. dated 6/24/08 both state ***"DeVaal does not disclose disconnecting the electrical load from the fuel cell in the event that there is no flow of gas from the flow fields toward ambient".***

Neither major element of the claims is disclosed in the cited art.

(10) ARGUMENT

The rejections appealed from in the Office Action of 6/24/08 were repeated verbatim from the Office Action of 12/20/07 ("Rejection" hereafter) to which applicant responded on 2/22/08 ("Response", hereafter).

Claims 1, 2, 4 and 5, 35 USC 102e, deVaal et al

(Claims 1, 2, 4 and 5 argued as a group)

The Examiner erred at Rejection, page 3, lines 5-8; "*The reference discloses...sensing the direction of flow of gas between said flow fields and ambient (column 9, lines 9-15).*" Applicant responded at Response page 1, lines 12-16 through page 2, line 4 of

the Response. The Examiner erred at Rejection, page 3, lines 8-12: "*The sensing takes place when the hydrogen concentration sensor monitors the hydrogen concentration level in the ambient atmosphere surrounding the fuel cell stack, to determine that the flow of fuel is from the flow fields to the ambient (column 9, lines 9-15).*" Applicant responded at Response page 2, lines 5-9, lines 14 and 15, and lines 29 and 30. The Declaration of Carl Reiser dated 2/18/08 ("Reiser", hereafter) made under the penalties of perjury, presenting only facts taken from the reference (deVaal) itself, and totally unrefuted by the Examiner, establishes as fact in paragraph 6 that deVaal measures concentration (not flow), and establishes as fact in paragraph 11 that "*deVaal does not disclose monitoring any flow whatsoever.*" This argument was made at Response page 3, lines 3-5.

The Examiner erred at Rejection page 3, lines 12-15: "*DeVaal also discloses disconnecting...in response to a low gas concentration...(column 14, lines 48-51). The phrase 'low gas flow encompasses the claimed limitation' no gas flow.*"' [Emphasis added] Applicant responded to this at Response page 3, lines 5-8. Arbitrarily converting "concentration" to "flow" is error; this argument was not previously made.

The Examiner erred at Rejection page 3, lines 16-23 in applying the rule about "manner in which a claimed apparatus is intended to be employed" to claims 1 and 4, because they are method claims. This argument was not previously made.

The Examiner erred at page 4, lines 6-12: "*DeVaal et al discloses...a means for sensing the direction of flow of gas between said flow fields and ambient...(column 8, lines 22-28).*" Applicant

responded to this allegation at Response, page 2, lines 9-13. Reiser establishes as unrefuted fact in paragraph 11 that "*deVaal does not disclose monitoring any flow whatsoever.*"

Claims 1 and 4, 35 USC 103(a), deVaal et al

(Claims 1 and 4 argued as a group)

The Examiner erred at Rejection page 5, lines 4-11 of paragraph 6: "*The reference discloses ...sensing the direction of flow of gas between said flow fields and ambient (column 9, lines 9-15).*" "*The sensing takes place when the hydrogen concentration sensor...to determine that the direction of flow of fuel is from the flow fields to the ambient (column 9, lines 9-15).*" Applicant responded at Response page 3, lines 11-17, citing Reiser, paragraph 11. Applicant responded to a similar allegation at Response page 2, lines 5-9, lines 14 and 15, and lines 19 and 20, as described at the top of page 5, hereinbefore. Paragraph 11 of Reiser establishes as unrefuted fact that "*deVaal does not disclose monitoring any flow whatsoever.*"

The Examiner erred in concluding, at Rejection, page 5, last line, to page 6, line 4: "*It would have been obvious...to disconnect the electrical load when no gas flow is sensed....*" There is nothing of record to suggest that. Applicant responded to this erroneous conclusion at Response, page 3, lines 18-23. The Examiner admits in the last full sentence on page 5 of the Rejection that "*DeVaal et al does not disclose disconnecting the electrical load from the fuel cell in event that there is no flow of gas from the flow fields toward ambient.*"

Claim 3, 35 USC 103(a) deVaal et al in view of Gast (Publication US 2005/0161520)

Claim 3 will stand or fall with its parent claim 2.

Errors in Response to Arguments

In the Office Action dated 6/24/08, ("Office Action", hereafter), the "Response to Arguments", beginning on page 6, contains erroneous points and/or conclusions (which will not be so identified). Applicant has not previously had an opportunity to respond to these errors.

The Examiner erred at Office Action page 7, lines 4-8: "*A first rejection...is made because the method describes a process wherein a step occurs in response to other conditions; i.e., gas flow. If the condition is not met, then the claim does not require the method step.*" What does this mean? What authorizes such an analysis? How did this reasoning affect the Examiner's conclusion? This is contrary to law. This argument has not previously been made.

The Examiner erred at Office Action page 9, lines 18 and 19: "*...The system of deVaal teaches all the claimed elements as noted.*" This has been addressed hereinbefore.

The Examiner erred at Office Action page 11, lines 3 and 4: "*By measuring the hydrogen content, flow from the fuel cell is sensed.*" In deVaal, hydrogen concentration could go up or down without any flow of hydrogen, simply resulting from a change in the amount of oxygen at the place where hydrogen concentration is sensed. This argument was not previously made.

The Examiner erred at Office Action page 13, lines 10-12: "*In order for hydrogen to be sensed in the ambient, hydrogen must flow through the exhaust. Therefore, flow to the ambient is measured using hydrogen concentration found in the ambient exhaust.*" While concentration may indicate presence of hydrogen in the ambient, and thus, that hydrogen had flowed to ambient at some time or another, measuring hydrogen concentration is not "sensing the direction of the flow of gas" as called for in the claims. This argument was not previously made.

The Examiner erred at Office Action page 13, lines 18-20. In response to Applicant's assertion quoted at page 13, lines 13-17, that "Claim 3 is patentable as depending from claim 2; claim 2 is patentable because deVaal does not disclose sensing...flow...and disconnecting the electrical load if there is no flow...." The Examiner states *"...one cannot show non obviousness by attacking references individually where the rejections are based on combinations of references.*" However, if the rejection is "A in view of B; A shows X and Y and B shows Z", the rejection is defeated by proving that A does not show X and Y, as is the case here! DeVaal does not disclose sensing flow nor disconnecting load if there is no flow. This argument was not previously made.

The Examiner erred at Office Action page 13, line 22 to page 14, line 2: "*As noted in the rejection, deVaal et al does disclose sensing the direction of flow between the flow fields and ambient and disconnecting the electrical load if there is no flow.*" Sensing the direction" has been addressed hereinbefore. However, **the Examiner clearly states** at Office Action page 5, lines 3-5 "*DeVaal et*

al does not disclose disconnecting the electrical load from the fuel cell in the event that there is no flow of gas from the flow fields toward ambient." This argument was made at Response, page 1, lines 6-12.

The Examiner erred at Office Action page 14, line 2: "Thus, the primary reference teaches the claim limitation." This erroneous conclusion was not previously challenged. Paragraph 11 of Reiser and the Examiner's admission (preceding paragraph, above) refute this erroneous conclusion.

APPENDIX

CLAIMS

1. **(Rejected)** A method of reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load, comprising:

providing fuel reactant gas to fuel reactant gas flow fields of the fuel cell power plant;

purging to ambient, at least periodically, at least a small amount of partially depleted fuel reactant gas exiting from said flow fields;

sensing the direction of flow of gas between said flow fields and ambient; and

disconnecting the electrical load from the fuel cell stack in the event that there is no flow of gas from said flow fields toward ambient.

2. **(Rejected)** Apparatus for reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load, comprising:

a fuel cell power plant having fuel reactant gas flow fields;

means for providing fuel reactant gas to said flow fields;

means for purging at least periodically, at least a small amount of partially depleted fuel reactant gas exiting from said flow fields;

means for sensing the direction of flow of gas between said flow fields and ambient; and

means for disconnecting the electrical load from the fuel cell stack in the event that there is no flow of gas from said flow fields toward ambient.

3. **(Rejected)** Apparatus according to claim 2 wherein said means for sensing the direction of flow comprises a flap disposed within the flow of gas which will operate a switch when the flow of gas is toward ambient.

4. **(Rejected)** A method of reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load, comprising:

providing fuel reactant gas to fuel reactant gas flow fields of the fuel cell power plant;

purging to ambient, at least periodically, at least a small amount of at least partially depleted fuel reactant gas exiting from said flow fields;

sensing the direction of flow of gas from said flow fields; and

disconnecting the electrical load from the fuel cell stack in response to no flow of gas from said flow fields toward ambient.

5. **(Rejected)** Apparatus for reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load, comprising:

a fuel cell power plant having fuel reactant gas flow fields;

means for providing fuel reactant gas to said flow fields;

means for purging at least periodically, at least a small amount of fuel reactant gas exiting from said flow fields;

means for sensing the direction of flow of gas from said flow fields; and

means for disconnecting the electrical load from the fuel cell stack in response to no flow of gas from said flow fields toward ambient.

Claim Support and Drawing Analysis

1. A method of reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load {page 4, lines 1-3; Figs. 1, 5 & 6: **31-34**}, comprising:

providing fuel reactant gas to fuel reactant gas flow fields {page 3, lines 16-19; Figs. 1, 5 & 6: **9-12**} of the fuel cell power plant;

purging to ambient {page 3, lines 21-27; Figs. 1, 5 & 6: **19-21, 26, 28**}, at least periodically, at least a small amount of partially depleted fuel reactant gas exiting from said flow fields;

sensing the direction of flow of gas {page 4, lines 4-7; Figs. 1-6: **38**} between said flow fields and ambient; and

disconnecting the electrical load from the fuel cell stack {page 4, lines 7-9; Figs. 1, 5 & 6: **26, 34, 35, 39**} in the event that there is no flow of gas from said flow fields toward ambient {page 4, lines 10-29; Figs. 1, 5 & 6: **38**; Figs. 2 & 4: **44, 53, 54**}.

2. Apparatus for reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load {page 4, lines 1-3; Figs. 1, 5 & 6: **31-34**}, comprising:

a fuel cell power plant having fuel reactant gas flow fields {page 3, line 16; Figs. 1, 5 & 6: **9**};

means for providing fuel reactant gas to said flow fields {page 3, lines 16-19; Figs. 1, 5 & 6: **10-12**};

means for purging {page 3, lines 21-27; Figs. 1, 5 & 6: **19-21, 21, 26, 28**} at least periodically, at least a small amount of partially depleted fuel reactant gas exiting from said flow fields;

means for sensing the direction of flow of gas {page 4, lines 4-7; Figs. 1-6: **38**} between said flow fields and ambient; and

means for disconnecting the electrical load from the fuel cell stack {page 4, lines 7-9; Figs. 1, 5 & 6: **26, 34, 35, 39**} in the event that there is no flow of gas from said flow fields toward ambient {page 4, lines 10-29; Figs. 1, 5 & 6; **38**; Figs. 2 & 4: **44, 53, 54**}.

4. A method of reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load {page 4, lines 1-3; Figs. 1, 5 & 6: **31-34**}, comprising:

providing fuel reactant gas to fuel reactant gas flow fields {page 3, lines 16-19; Figs. 1, 5 & 6: **9-12**}of the fuel cell power plant;

purging to ambient {page 3, lines 21-27; Figs. 1, 5 & 6: **19-21, 21, 26, 28**}, at least periodically, at least a small amount of at least partially depleted fuel reactant gas exiting from said flow fields;

sensing the direction of flow of gas {page 4, lines 4-7; Figs. 1-6: **38**} from said flow fields; and

disconnecting the electrical load from the fuel cell stack {page 4, lines 7-9; Figs. 1, 5 & 6: **26, 34, 35, 39**} in response to no flow of gas from said flow fields toward ambient {page 4, lines 10-29; Figs. 1, 5 & 6: **38**; Figs. 2 & 4: **44, 53, 54**}.

5. Apparatus for reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load {page 4, lines 1-3; Figs. 1, 5 & 6: **31-34**}, comprising:

a fuel cell power plant having fuel reactant gas flow fields {page 3, line 16; Figs. 1, 5 & 6: **9**};

means for providing fuel reactant gas to said flow fields {page 3, lines 16-19; Figs. 1, 5 & 6: **10-12**};

means for purging {page 3, lines 21-27; Figs. 1, 5 & 6: **19-21, 21, 26, 28**} at least periodically, at least a small amount of fuel reactant gas exiting from said flow fields;

means for sensing the direction of flow of gas {page 4, lines 4-7; Figs. 1-6: **38**} from said flow fields; and

means for disconnecting the electrical load from the fuel cell stack {page 4, lines 7-9; Figs. 1, 5 & 6: **26**, **34, 35, 39**} in response to no flow of gas from said flow fields toward ambient {page 4, lines 10-29; Figs. 1, 5 & 6: **38**; Figs. 2 & 4: **44, 53, 54**}.

Means or Step Plus Function Analysis

2. Apparatus for reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load, comprising:

a fuel cell power plant having fuel reactant gas flow fields;

means for providing {page 3, lines 16-19; Figs. 1, 5 & 6: **10-12**} fuel reactant gas to said flow fields;

means for purging {page 3, lines 21-27; Figs. 1, 5 & 6: **19-21, 26, 28**} at least periodically, at least a small amount of partially depleted fuel reactant gas exiting from said flow fields;

means for sensing {page 4, lines 4-7; Figs. 1-6: **38**} the direction of flow of gas between said flow fields and ambient; and

means for disconnecting {page 4, lines 7-9; Figs. 1, 5 & 6: **26, 34, 35, 39**} the electrical load from the fuel cell stack in the event {page 4, lines 10-29; Figs. 1, 5 & 6: **38**; Figs. 2 & 4: **44, 53, 54**} that there is no flow of gas from said flow fields toward ambient.

5. Apparatus for reducing performance degradation due to hydrogen starvation of a fuel cell power plant providing electrical power to a load, comprising:

a fuel cell power plant having fuel reactant gas flow fields;

means for providing {page 3, lines 16-19; Figs. 1, 5 & 6: **10-12**} fuel reactant gas to said flow fields;

means for purging {page 3, lines 21-27; Figs. 1, 5 & 6: **19-21, 26, 28**} at least periodically, at least a small amount of fuel reactant gas exiting from said flow fields;

means for sensing {page 4, lines 4-7; Figs. 1-6: **38**} the direction of flow of gas from said flow fields; and

means for disconnecting {page 4, lines 7-9; Figs. 1, 5 & 6: **26, 34, 35, 39**} the electrical load from the fuel cell stack in response to {page 4, lines 10-29; Figs. 1, 5 & 6: **38**; Figs. 2 & 4: **44, 53, 54**} no flow of gas from said flow fields toward ambient.

EVIDENCE SECTION

Contents

Affidavits and Declarations

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Carl A. Reiser

Serial No. 10/765,737

Filed: January 27, 2004

Title: Internal PEM Fuel Cell Water Management

Docket: C-3363

Art Unit: 1795

Examiner: O'Neill, Karie Amber

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Carl Reiser declare that:

1. I reside at 25 Orchard Street, #19, Stonington, CT 06378.

2. I have a Bachelor of Science degree in Mechanical Engineering and have been working in the field of fuel cells and related arts for over 40 years, and am currently engaged in that field on behalf of UTC Power Corporation, South Windsor, CT.

3. I have familiarized myself with the matter claimed in the subject application, and with the relevant contents of de Vaal et al US 6,815,101 (de Vaal).

4. de Vaal's hydrogen sensor S5 is located at the opposite end of the stack from the purge valve 70 – see right end of Fig. 6 (S5) and Fig. 5 (bracket 741), and column 10, lines 62-64 (10:62-64); one-third from left end of Figs. 5 and 6 (purge valve 70); the purge valve 70 is ducted to the cooling airflow (11:27-29), within which airflow S5 is located.

5. In de Vaal, the hydrogen concentration is monitored in the environment of the fuel cell, including air, in which oxygen is also monitored – see 1:46-49 (column 1, lines 46-49); 2:5; 3:40-43; 4:7-13; 10:14-25; 11:9-13; and 11:27-29.

6. The purpose of monitoring the hydrogen concentration is to assure remaining safely (1%) below the lower flammability limit of hydrogen (4%) – see 2:52-54; 3:27-32; 55-61; 13:28-34, 35-37, 61-64; 18:6, 8, 45, 46, 51, 52, 54, 55; and 19:22-26.

7. de Vaal seeks to avoid an excess of hydrogen whereas the subject claims relate to avoiding a dearth of hydrogen – see 2:49-52; 3:48-54; 8:33-38; and 17:2-5.

8. de Vaal senses hydrogen not only vented by the purge valve 70 from the fuel flow fields, but also from leaks - see 11:16, 17, 31, 39; and 14:11.

9. de Vaal suggests at 14:7-12, monitoring oxygen concentration as a backup to monitoring hydrogen.

10. From the facts set forth in paragraphs 5 and 8 hereinbefore, it is clear that de Vaal does not disclose monitoring any parameter from fuel flow fields, but rather monitors an environment that includes cooling air and gas from leaks.

11. de Vaal does not disclose monitoring any flow whatsoever.

12. de Vaal does not disclose monitoring of hydrogen unadulterated by air.

13. All statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Carl Reiser

Carl Reiser

2/18/08

Date

Respectfully submitted,

M. P. Williams
Attorney of Record
Reg. No. 19,220
Phone: 860-649-0305
Fax: 860-649-1385
E-mail: mw@melpat.com

210 Main Street
Manchester, CT 06042
Date: November 4, 2008